viz. August, the chicken is hatched out, and becomes the unwilling recipient of so much attention from its parents, and from such other adults as have no young of their own to attend to, that upwards of 77 per cent. die, and may be picked up frozen on the sea-ice, within the first month or two of their existence. This high death-rate is in a large measure the result of the quarrels of adult birds for possession of a chicken, all having an overpowering desire to brood over something. In many cases the desire leads to brooding over dead chicks until they are actually rotten.

Much was said of the trials that must be endured by the naturalist who wishes to see this bird in its breeding haunts. He must be ready to encounter the lowest temperatures hitherto recorded, under canvas, sleeping three in a bag for what warmth can be procured at 40°, 50°, and 60° below zero Fahrenheit, and for a fortnight or three weeks at a stretch. Much, also, was said of the various sledge expeditions undertaken, after its first discovery by Engineer-Lieutenant Skelton, R.N., for the purpose of fully investigating the emperor penguin rookery at Cape Crozier; of the discovery of the first egg on the sea-ice by Lance-Corporal Blissett, R.M.L.I., and of the exceptional circumstances which, in the following year, enabled the lecturer to bring back to the ship a series of some fourteen eggs and several dozen of the young.

Examples were shown at the close of the lecture, which was further illustrated by a series of lantern slides, made from photographs taken mainly by Mr. Skelton and from drawings by the lecturer of the various stages in growth of the emperor penguin, from infancy to old age.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

IN view of the approaching contest for the representation of the University of London in Parliament, Sir Michael Foster, K.C.B., and Sir Philip Magnus have placed their opinions before members of Convocation of the University.

SIR WILLIAM ANSON has accepted the position of president of the Association of Technical Institutions for next year in succession to Sir Philip Magnus. The annual meeting of the association will be held at the Fishmongers' Hall on January 26 and 27.

THE annual conversazione of the Royal College of Science and Royal School of Mines was held on December 20. All the departments of the college and school were open, and many interesting exhibits were shown in chemistry, physics, mechanics, metallurgy, mining, geology, botany, and zoology, including applied science. The metallurgy section comprised a working exhibition of Japanese smelting methods shown for the first time in Europe. Japanese casting was made during the evening. The programme also included a lecture by Prof. S. H. Cox on "Incidents of a Mining Career."

THE late Mr. John Feeney, by his will dated June 22, 1903, bequeathed sums amounting to 89,000*l.* towards various institutions and objects connected with Birmingham and district. These include 20,000*l.* to the University of Birmingham. This bequest is for the purpose of maintaining a professor, with suitable equipment, lecturing on some one or more scientific subjects directly connected with some one or more of the trades and industries carried on in or near Birmingham. All the bequests are given free of legacy duty, but payment cannot be claimed until the expiration of five years.

THE Board of Education has published the reports, for the year ending March 31, 1905, of fourteen colleges which participated during the year in the annual grant, amounting to 54,000*l.*, made by Parliament for "university colleges in Great Britain," and from the three colleges in Wales which receive a grant of 4000*l.* each. The reports have been compiled, so far as has been found conveniently possible, under the same headings as those adopted in previous years. The distinguishing characteristic of the reports is the elaborate balance sheet with which each is provided showing exactly the revenue available in the case of each college and what precisely is done with it.

A BLUE BOOK (Cd. 2782) has been published giving the statistics of public education in England and Wales for the years 1903–5. The volume of 442 pages is divided into three sections, dealing respectively with elementary schools, State-aided secondary schools, and technical institutions, schools of art and day art classes, evening schools, and similar forms of education. A technical institution within the meaning of the regulations of the Board of Education is an institution giving an organised course of instruction in day classes, including advanced instruction, and provided with a staff and equipment adequate for the purpose. Provision must be made for at least a two years' systematic course in science, or in science and art, either alone or in conjunction with subjects of general, commercial, manual, or technological instruction; and subject to certain temporary provisions, no student may be admitted to the course unless he has passed through, at least, a three years' course of instruction in a school recognised under the regulations of the Board for secondary schools, or unless he is more than sixteen years of age and is qualified from his general education to profit by a course of advanced instruction. These institutions, in fact, afford instruction adapted for the preparation of young men for employment in connection with the trades, manufactures, and commerce of the country. They also provide higher courses of specialised instruction in science in relation to particular industries, likely to be required by students who have already had a good training in pure science. The number of these institutions receiving grants was nineteen in 1903–4. The number of students who attended at all during the year was 2143, and a grant of 5683*l.* was paid on 1056 of these who attended a full course of instruction. In the same year there were 5579 recognised evening schools with 696,882 students in attendance, on whose work a grant of 304,962*l.* was paid.

AT the annual headmasters' conference held at the College of Preceptors, London, on December 21, the subject of the inspection of schools was dealt with very fully, and numerous resolutions were adopted. Dr. Gow, of Westminster, moved a resolution, subsequently carried *nem. con.*, that the conference desires to emphasise the principle that inspection should take into due consideration the aims and circumstances of the school inspected, and regard intellectual methods and results as of greater weight than material equipment and appliances. Dr. Gow is reported by the Press to have said "there is a general opinion on the part of the public, which is shared by many teachers of science, that great expenditure is necessary for effective scientific teaching, and that schools are invited to compete with one another in mere expenditure. This competition is bad for the schools, for the teachers, and for the boys." It may be contended, he continued, that the better the teacher the more apparatus he wants, but Dr. Gow admitted that his own experience is the contrary of this. "No contention can be more absurd," he concluded by saying, "than that science teaching differs from any other because the science teacher does not teach by authority; it is, as a fact, conducted quite as much on authority as classical teaching, or divinity, or any other subject. The experiments are merely illustrations." The headmaster of Westminster has apparently been unfortunate in his experience of science teaching. Every man of science agrees with him that for the effective teaching of the broad principles of science the simplest apparatus, if of the right kind, is sufficient. This competition among schools to provide the most luxurious laboratories and lavishly stocked lecture-rooms, if it exists, is at least a very modern growth, and should, as Dr. Gow maintains, be discouraged. But at the same time a sensibly designed science workshop with simple fittings and an adequate supply of ordinary apparatus is an absolute necessity for every efficient school. It is difficult to understand what Dr. Gow means when he maintains that science teaching is as much based on authority as the teaching of classics or divinity. There is a confusion of thought here. Reasonable science teaching, with which Dr. Gow seems unfamiliar, insists that the pupil shall believe only because experimental results leave no other alternative, and not because a teacher or a text-book makes a statement. If in any school experiments are used only as illustrations the methods of science

are not followed, and the work is not what men of science desire to encourage. It is satisfactory to know that at least in a large number of our secondary schools the science periods are made the means of inculcating habits of careful observation, persistent verification, and truthful reasoning.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, November 23.—"On the Effects of Alkalies and Acids, and of Alkaline and Acid Salts, upon Growth and Cell Division in the Fertilised Eggs of *Echinus esculentus*.—A Study in Relationship to the Causation of Malignant Disease." By Prof. B. **Moore,** Dr. Herbert E. **Roaf,** and E. **Whitley.** Communicated by Prof. W. A. Herdman, F.R.S.

The attention of the authors was attracted to the study of the effects of small variations in reaction upon the growth of cells from the biochemical point of view, as a result of the observation that in malignant disease no hydrochloric acid is in general secreted by the gastric glands, no matter where the malignant growth is situated, which pointed to an increased alkalinity of the plasma.

In the course of investigations upon the rate of growth of the cell, when microscopic examination was made of the cells in the fresh condition, the authors were struck by the marked irregularities in size and shape of the developing cells in alkaline media, illustrated by cells in fresh solution developing in sea-water, to which di-sodium phosphate has been added, and also by marked tendencies to nuclear proliferation.

This led secondarily to a cytological investigation of the cells when fixed and stained to show nuclear division, as a result of which the authors have found the irregular forms of mitosis described in the paper. These atypical divisions, which have been produced by variations in the medium similar to those which occur in the blood in cases of malignant disease, closely resemble the pathological divisions seen in the growths of malignant disease.

The results of the experiments and their relationship to the processes in malignant growths may be summarised as follows:—

(1) In nearly all cases of malignant disease the secretion of hydrochloric acid by the gastric glands is stopped or greatly reduced, and this effect is not due to local conditions in the stomach, since it occurs wherever the growth is situated, but is due to a change in the distribution of salts in the plasma whereby the alkalinity is increased or the concentration in hydrogen ions diminished.

(2) Addition of *small* amounts of alkalies or alkaline salts, such as di-sodium phosphate, to the medium in which cells are growing and dividing causes at first an increase in rate of growth and division, but as the amount is increased there appears a marked tendency to irregularity in size and shape of the resulting cells. Nuclear division becomes in advance of cytoplasmic division, so that the cells become multi-nucleated. As the alkali is further increased, both cell division and nuclear division are stopped.

(3) Accompanying the increased stimulus to nuclear division given by the dilute alkali, there are seen many of the atypical forms of mitosis described in malignant growths. The variations from the normal illustrated in the drawings are:—(1) multiple nuclei in the same cell in active division; (2) multipolar mitosis, occurring both in the single cell stage, and later in the development of the organism; (3) asymmetrical mitosis, leading to unequal distribution of chromosomes to the two daughter cells; (4) reduction in length of the chromosomes as the strength of alkali is increased until the chromosomes appear as rounded dots, and accompanying the reduction in length there is also a reduction in number to about one-half the normal; (5) in certain cases the chromatin becomes arranged in circles, each of which shows a number of thickenings. The circles are arranged in groups in the cell, and appear to represent a stage in the anaphase, the groups being placed at about the usual distance apart of the centrosomes, and traces of the achromatic fibres being occasionally visible.

"On certain Physical and Chemical Properties of Solutions of Chloroform and other Anæsthetics.—A Contribution to the Chemistry of Anæsthesia. (Second Communication.)" By Prof. B. **Moore** and Dr. Herbert E. **Roaf.** Communicated by Prof. C. S. Sherrington, F.R.S.

The experiments recorded in the present communication support the conclusion drawn in a previous paper by the authors that anæsthetics form unstable compounds or aggregates with the proteids of the tissue cells, and that anæsthesia is due to a paralysis of the chemical activities of the protoplasm as a result of the formation of such aggregations.

The comparative experiments with ethereal extracts demonstrate that the action is upon the cell proteids and not upon the lipöids.

The compounds or aggregations so formed are unstable, and remained formed only so long as the pressure of the anæsthetic in the blood is maintained.

The results of the experiments may be summarised as follows:—

(1) The solubility of all anæsthetics experimented with is higher in serum than in water.

(2) At a certain concentration, definite for each anæsthetic, there occur opalescence and commencing precipitation of proteid.

(3) At equal concentration of chloroform in water or saline on the one hand, and serum, hæmoglobin, or the tissues (brain, heart, muscle, and liver) on the other, the vapour-pressure is always higher in the former than in the latter.

(4) The curve connecting vapour-pressure and concentration is, in the case of water and saline, a straight line; while in the case of serum, hæmoglobin, and the tissue proteids it is a curve showing association, especially at the higher concentrations.

(5) Comparative determinations of vapour-pressure and concentration, in serum and brain tissue and in ethereal extracts of these equal in concentration of lipöid, show that the proteid of the tissue combines with the anæsthetic.

(6) Determinations of the effects of addition of chloroform upon the lowering of freezing point confirm the results obtained by the vapour-pressure and solubility determinations.

(7) Determinations of the changes in electrical conductivity caused by addition of chloroform indicate that accompanying the combination of the anæsthetic with the proteid there takes place a splitting off of electrolytes.

(8) When the lipöids, extracted from serum or tissues by ether, are made up into an emulsion with normal saline, many of the lipöids take the form of bi-concave discs.

(9) The lipöid emulsions are very permanent, but separate on the addition of anæsthetics or neutral salts, in similar fashion to colloidal solutions.

"A Note on the Effect of Acid, Alkali, and certain Indicators in Arresting or otherwise Influencing the Development of the Eggs of *Pleuronectes platessa* and *Echinus esculentus*." By E. **Whitley.** Communicated by Prof. W. A. Herdman, F.R.S.

(1) The amount of variation from the normal concentration of hydrogen and hydroxyl ions in sea-water which the eggs of Pleuronectes will tolerate is very small.

(2) A disturbance of the equilibrium towards the acid side is much more fatal than the opposite.

(3) A progressive development of resistance to an unfavourable action of the environment takes place in proportion to the age of the eggs.

(4) Phenolphthalein is deadly to the eggs of *Echinus esculentus,* but harmless to those of Pleuronectes, while dimethyl quickly kills the latter, and appears, if anything, to have a favourable influence upon the development of the former.

Anthropological Institute, December 5.—Prof. W. Gowland, president, in the chair.—A Dyak witch doctor's medicine chest: R. **Shelford.** The chest is cylindrical in shape and about a foot high, and contains various charms, including water-worn pebbles, a crystal, used for a kind of crystal gazing, and a few simples which have actual curative properties.—Ruins in Rhodesia: D. Randall